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| 10/653,651 | 09/02/2003 | George J. Miao | | 3408 |

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GEORGE J. MIAO
20400 VIA PAVISO, # A27
CUPERTINO, CA 95014

EXAMINER

PATHAK, SUDHANSHU C

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| ART UNIT | PAPER NUMBER |
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2611

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/653,651 | | MIAO, GEORGE J. | |
| | Examiner | | Art Unit | |
| | Sudhanshu C. Pathak | | 2611 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Sept. 2nd, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,9-12,14,17,18 and 20 is/are rejected.
- 7) ☒ Claim(s) 2-8,13,15,16 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Sept. 2nd, 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-20 are pending in the application.

Specification

2. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

Drawings

3. Figure 1 is objected to because of the following informalities:

Figure 1, discloses a channel wherein channel is spelled as "Channle".

Appropriate correction is required.

Claim Objections

4. Claim 1 is objected to because of the following:

Claim 1 discloses a "multiuser encoding and spreading unit" (Claim 1, line 3) and further discloses "a filtering and spreading unit", however, it is not clear as to if there are only one spreading unit or two. Furthermore, in regards to the specification of the instant application (Fig. 2, element 246 & Specification, Page 12, lines 23-26) as

the filtering and spreading unit to produce even and odd sequences. Furthermore, the spreading unit in context to the filtering and spreading unit however does not actually perform filtering or spreading as is disclosed in the specification as described above. Therefore, for the purposes of claim rejection the only spreading unit is the one in context to the encoding and spreading unit i.e. only one spreading unit is present.

Appropriate correction is required.

5. Claim 1 is also objected to because of the following:

Claim 1 discloses multiple acronyms such as MIMO, OFDM, UWB and IFFT. These should be replaced as multiple-input-multiple-output (MIMO), orthogonal frequency division multiplex (OFDM), ultra wideband (UWB) and inverse fast Fourier transform (IFFT).

6. Claim 2 is also objected to because of the following:

Claim 2 discloses an acronym such as RAM, this should actually be Random Access Memory (RAM). Appropriate correction is required

7. Claim 4 is also objected to because of the following:

Claim 4, on line 4 discloses "...two XOR...", this should actually be "...two XOR gates...". Appropriate correction is required.

8. It is recommended that all the claims be reviewed wherein all the acronyms used be defined.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to

prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1, 9-10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/643,302 in view of Applicant Admitted Prior Art (AAPA). This is a provisional obviousness-type double patenting rejection.

In regards to Claim 1, Claim 1 of the co-pending application discloses a based multiuser OFDM multiband of UWB base station communication transmitter (copending Claim 1, lines 1-2) comprising: a multiuser encoding and spreading unit (copending Claim 1, line 3); a polyphase-based multiband (copending Claim 1, line 4); an IFFT unit (copending Claim 1, line 5); a filtering unit (copending Claim 1, line 6) {Interpretation: The copending specification (Page 11, lines 5-7 & Fig. 2, element 246) discloses the filtering section performs the same function as the filtering and spreading unit of the instant application (Fig. 2, element 246 & Page 12, lines 23-

26), therefore the two claim limitations are functionally equivalent}; a multiband based modulation and multicarrier RF unit (copending Claim 1, line 7). However, the Claim 1 of the copending application does not disclose a MIMO based transmitter and a multiple antenna unit.

The AAPA discloses a MIMO wireless link providing space time signal processing for transmitting data, comprising multiple spatially distributed antennas (Specification, Page 5, lines 13-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches a MIMO based communications (transmitter) system and this is implemented in the transmitter as described in Claim 1 so as to improve the bit-error rate and the network's quality of service in a multipath environment. Furthermore, it would have been obvious to one of ordinary skill in the art that a MIMO system comprises multiple antennas. Furthermore, the instant application Claim 1 does not explicitly disclose a DSSS transmitter, however the instant application claim 1 discloses a spreading unit, which one of ordinary skill in the art would recognize as a DSSS system wherein the spreader is implemented as is also in the instant application.

In regards to Claims 9-10 (dependent on claim 1), Claim 1 of the co-pending application discloses a based multiuser OFDM multiband of UWB base station communication transmitter as described above. However, Claim 1 of the copending application does not disclose said multiple antenna unit may either enhance UWB signals quality or increase UWB transmitting distance and wherein multiple antenna unit includes eleven independent antennas:

The AAPA discloses a MIMO wireless link providing space time signal processing for transmitting data, comprising multiple spatially distributed antennas wherein the AAPA further discloses MIMO link increases the received signal quality especially in severe multipath environment (Specification, Page 5, lines 13-25) {Interpretation: The AAPA discloses a MIMO system comprising multiple antennas wherein multiple antennas include eleven antennas}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that copending application in view of AAPA satisfies the limitations of the claims. Furthermore, there is no criticality in selecting eleven antennas in a MIMO system this is a matter of design choice depending on the processing power of the base station and the channel conditions.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1 & 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Wu et al. (6,985,434) in view of Lakkis (7,031,371).

In regards to Claims 1 & 10, Wu discloses a MIMO-based multiuser OFDM multiband of UWB base station communication transmitter (Abstract, lines 1-5 & Fig.'s 1, 5) comprising: a multiuser encoding (Fig. 1, element "FEC Encoder"); a

polyphase-based multiband (Fig. 1, element "Multiplex" & Fig. 5, element "Multiplex"); an IFFT unit (Fig. 5, element "IFFT"); a filtering and spreading unit (Fig. 5, element "switch") {Interpretation: The reference discloses the switch element between the multiplexer element and the FIFO buffer element this is interpreted as the filtering and spreading limitation as is also disclosed in the instant specification on Page 12, lines 23-26 of the instant application}; a MIMO-based multiband modulation (Fig. 1, elements "STTD/SM OFDM Encoder" & "STTD/SM Assignment" & Column 5, lines 17) {Interpretation: The reference discloses the STTD OFDM encoder which provides the OFDM subcarriers and RF processing for transmission}; and a multiple antenna unit wherein the multiple antenna unit includes eleven independent antennas (Fig. 1, elements "Antennas 1-M). However, Wu does not disclose a spreading unit and a multicarrier RF unit.

Lakkis discloses a communications system adapting a DSSS system with an OFDM system (Column 1, lines 5-12, 50-60 & Column 2, lines 20-25, 30-35 & Column 11, lines 4-12 & Fig. 12, element 110). Lakkis further discloses the transmitter comprising a spreader and multicarrier RF unit (Fig. 3, element 48 & Fig. 12, elements 110, 90, 94 & Column 6, lines 5-9 & Column 10, lines 54-67 & Column 11, lines 4-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Lakkis teaches a spreading unit and a multicarrier RF unit and this is implemented in the transmitter as described in Wu so as to be able to implement a DSSS system along with a OFDM system so as to increase the network capacity so as to be able to provide each user with a specific code so as to

avoid multiple access interference between users. Furthermore, there is no criticality in having eleven antennas this is a matter of design choice depending on the computation power of the basestation. Furthermore, the limitations in the preamble of the claim are not given patentable weight if they are not in the body of the claim.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Wu et al. (6,985,434) in view of Lakkis (7,031,371) and further in view of Applicant Admitted Prior Art (AAPA).

In regards to Claim 9, Wu in view of Lakkis discloses a MIMO-based multiuser OFDM multiband of UWB base station communications transmitter as described above. However, Wu in view of Lakkis does not disclose said multiple antenna unit may either enhance UWB signals quality or increase UWB transmitting distance.

AAPA discloses MIMO wireless link wherein said multiple antenna unit may either enhance signals quality or increase transmitting distance (Specification, Page 5, lines 17-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches implementing a MIMO wireless system wherein said multiple antenna unit may either enhance UWB signals quality or increase UWB transmitting distance and this is implemented in Wu in view of Lakkis so as to improve the BER and simultaneously increase the data rate and network capacity as is described in Wu in view of Lakkis, thus satisfying the limitation of the claim.

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14. Claims 11-12 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (2005/0097427 A1) in view of Walton et al. (7,095,709).

In regards to Claims 11-12, Matsumoto discloses an OFDM multiband of communication receiver (Fig. 3 & Paragraphs 1-2) comprising: a combination section of an A/D unit (Fig. 3, element 141) and a digital receiver filter unit (Fig. 1, element 1 & Paragraph 75, lines 13-18) {Interpretation: The reference discloses a subtractor is interpreted as a digital filter since it removes symbol components formed from odd numbered subcarriers}; a TEQ (Fig. 3, element 142), FFT (Fig. 3, element 144) and FEQ section (Fig. 3, element 145); a polyphase-based demultiband (Fig. 3, element 143); and a despreading (Fig. 8(b), element 74 & Paragraph 12, lines 6-11 & Paragraph 17), deinterleaver (Fig. 3, element 150) and decoding section (Fig. 3, element 146). However, Matsumoto does not disclose the receiver being a MIMO based receiver comprising an antenna unit further comprising a two-antenna based RF multi band receiver unit and multiband despreading.

Walton discloses a MIMO based OFDM communications system (Column 1, lines 5-10) comprising an antenna unit further comprising multiple antennas (Fig. 2, element 106n, 252(a-r) & Column 4, lines 30-40, 63-67 & Column 5, lines 1-7) {Interpretation: The reference discloses a MIMO based OFDM system comprising multiple antennas which are identical and independent} further comprising a RF based multi band receiver (Fig. 9, element 254) and multiband despreading (Fig. 10, element 1122). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Walton discloses a MIMO based OFDM

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communications system comprising multiple antennas and multiband receiver and despreaders and this is implemented in the receiver as described in Matsumoto so as to provide increased multipath immunity in noisy environment and increased data rate. Furthermore, there is no criticality in having two antennas this is a matter of design choice depending on the computation capability of the mobile receiver. Furthermore, the limitations in the preamble of the claim are not given patentable weight if they are not in the body of the claim.

In regards to Claim 14, Matsumoto in view of Walton discloses a MIMO based multiuser OFDM multiband communications receiver as described above. Walton further discloses despreading produces a unique and orthogonal despreading sequence for each of the multi-frequency bands (Fig. 11, element 1122 & Column 19, lines 18-19 & Column 22, lines 4-20) {Interpretation: The reference discloses despreading the received signal with the walsh codes, which are orthogonal. Furthermore, in an OFDM system the subcarriers are orthogonal, as is also disclosed in the reference which employs walsh frequency and transmit diversity}. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Matsumoto in view of Walton satisfies the limitations of the claims.

15. Claims 17-18 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (7,095,709) in view of Applicant Admitted Prior Art (AAPA).

In regards to Claim 17, Walton discloses A MIMO-based multiuser OFDM multiband of communication system (Fig. 1 & Column 1, lines 5-10 & Column 2, lines 24-28) comprises a MIMO-based multiuser OFDM multiband of UWB base

station communication transmitter and receiver (Fig. 1, element 104 & Fig. 2, element 104, 222) {Interpretation: The reference discloses a base station transmitter and receiver}, and N users of the MIMO-based OFDM multiband of mobile communication transmitters and receivers (Fig. 1, elements 106(a-h) & Fig. 2, element 106 (a-h), 254). However, Walton does not disclose the base station and mobile stations in a UWB communications system.

AAPA discloses the implementation of ultra wide band communications (UWB) as per the FCC specifications (Specification, Pages 1-3 & Eq.'s 1-2). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches implementing UWB devices and this can be implemented in base station and mobile stations as described in Walton so as to incorporate the communications system in a UWB network so as to increase the efficiency of existing spectrum while minimizing the interference from the UWB devices on existing radio services.

In regards to Claim 18, Walton in view of AAPA discloses a MIMO-based multiuser OFDM multiband of UWB communication system comprising a base station and multiple mobile stations as described above. Walton further discloses said the MIMO- based multiuser OFDM multiband of UWB base station communication transmitter and receiver has eleven independent and identical antennas for eleven multi- frequency bands with a programmable use (Column 4, lines 30-41, 63-67 & Column 5, lines 1-7 & Fig. 2, elements 224(a-t), 252 & Fig. 3, element "coding control" & "modulation control") {Interpretation: The reference

discloses the base station comprising multiple antennas and further the antennas are independent and identical and the coding scheme is programmable therefore the antenna is for programmable use as per the instant specification. Furthermore, an OFDM system inherently comprises multi frequency bands i.e. subcarriers}.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that Walton in view of AAPA satisfies the limitations of the claim.

Furthermore, there is no criticality in having eleven antennas and eleven multi frequency bands this is a matter of design choice depending on the total bandwidth of the communications system and the users capacity and further the computation power of the basestation.

In regards to Claim 20, Walton in view of AAPA discloses a MIMO-based multiuser OFDM multiband of UWB communication system comprising a base station and multiple mobile stations as described above. Walton further discloses each of said the MIMO- based multiuser OFDM multiband of UWB mobile communication transmitters and receivers has two independent and identical antennas (Column 4, lines 30-41, 63-67 & Column 5, lines 1-7 & Fig. 2, elements 224(a-t), 252) {Interpretation: The reference discloses the mobile station(s) comprising multiple antennas and further the antennas are independent and identical}. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that Walton in view of AAPA satisfies the limitations of the claim. Furthermore, there is no criticality in having two antennas this is a matter of design choice depending on the computation capacity of the mobile station.

Allowable Subject Matter

16. Claims 2-8, 13, 15-16 & 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).

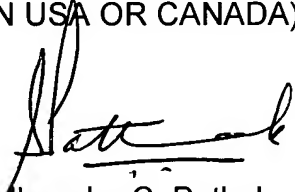
18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571)-272-3042.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sudhanshu C. Pathak
Examiner
Art Unit 2611